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Matric number: 18/MHS06/025

Course:BCH204

Assignment: write on the 3 stages of beta oxidation

BETA OXIDATION

This is the process by which fatty acid molecules are broken down in the cytosol in prokaryotes and in the mitochondria in eukaryotes to generate Acetyl-CoA which enters citric acid cycle, NADH+, FADH2 which are coenzymes used in electron transport chain.

Cn-acyl-CoA + FAD + NAD++ H2o Cn-2-Acyl-CoA + FADH2 +NADH + H+ +Acetyl- CoA

 STAGES OF BETA OXIDATION

1. Activation of Membrane Transport:

Free fatty acid cant penetrate any biological membrane due to their negative charge and penetrates only by carrier proteins. Once in the cytosol, long chain fatty acid catalyze the reaction between fatty acid with ATP acyl aldehyde which reactsbwith free coenzyme A to give a fatty Acyl-CoA ester. If the fatty acid has a short chain, short chain fatty acid can diffuse through inner mitochondrial membrane but if they are long chained, then carnitine palmitoyltranferase, carnitine acylcarnitine translocase and acyl-carnitine is transferred back to carnitine palmitoyltransferase.

1. General Mechanism:

Once the fatty acid is inside the mitochondrial matrix, beta oxidation occurs by clearing 2 carbon every cycle to for Acetyl-CoA. When there is even numbered unsaturated fatty acid, each cycle of beta oxidation liberates a 2 carbon unit but when it is odd numbered saturated fatty acid, they oxidize in the same manner as even but the final products are propionyl-CoA and Acetyl-CoA.